

## BAB VII

### PERHITUNGAN SAMBUNGAN BALOK B2 DENGAN KOLOM K

#### 7.1 Sambungan Balok B2 dengan Kolom K

##### Output Gaya Maksimum pada Sambungan hasil SAP

$$Mu := 9402.48 \text{ kgm}$$

$$Pu := 168.64 \text{ kg}$$

Direncanakan baut HTB  $\phi 16$  BJ 41

$$fub := 4100 \text{ kg/cm}^2$$

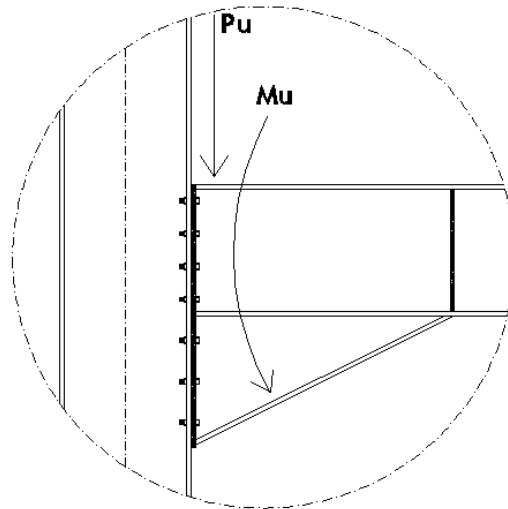
$$\Phi_{\text{baut}} := 16 \text{ mm}$$

$$Ab := \frac{\pi}{4} \cdot 1.6^2 = 2.011 \text{ cm}^2$$

Pelat penyambung BJ 37

$$fu := 3700 \text{ kg/cm}^2 \quad tp := 10 \text{ mm}$$

$$fy := 2400 \text{ kg/cm}^2$$



- Kontrol Geser

Direncanakan baut HTB 10  $\phi 16$

$$Vu := \frac{Pu}{10} = 16.864 \text{ kg}$$

$$fuv := \frac{Vu}{Ab} = 8.387 \text{ kg/cm}^2 \quad \blacksquare \leq \blacksquare \quad 0.5 \cdot 0.75 \cdot fub \cdot 1 = 1537.5 \text{ kg/cm}^2 \quad \text{OK!!}$$

- Beban Tarik ( interaksi geser dan tarik )

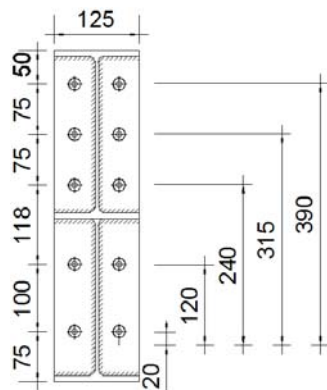
$$ft := (1.3 \cdot fub - 1.0 \cdot fuv) = 5321.613 \text{ kg/cm}^2 \quad \blacksquare \geq \blacksquare \quad fub = 4100 \text{ kg/cm}^2$$

$$ft := fub = 4100 \text{ kg/cm}^2$$

$$Td := 0.75 \cdot fub \cdot Ab = 6182.654 \text{ kg}$$

Mencari garis netral ----> anggap dibawah baut terbawah

$$a := \frac{10 \cdot Td}{12.5 \cdot 2400} = 2.06 \text{ cm} \quad \blacksquare \leq \blacksquare \quad 7.5 \text{ cm} \quad \text{OK!!}$$



Momen rencana yang dapat dipikul sambungan

$$\Phi M_n := \frac{\left[ \left( 0.9 \cdot 2400 \cdot a^2 \cdot \frac{12.5}{2} \right) + 2 \cdot T_d \cdot (2 + 12 + 24 + 31.5 + 39) \right]}{100} = 13989.738 \text{ kgm}$$

$$\Phi M_n = 13989.738 \text{ kgm} \quad \blacksquare \geq \blacksquare \quad M_u = 9402.48 \text{ kgm}$$

- **Sambungan Pelat dengan Balok ( Sambungan Las )**

Digunakan las  $F_{E70XX}$

Tebal las  $t_e := 1 \text{ cm}$

Profil balok B3 WF 250 x 125 x 6 x 9 BJ 37

$$h := 250 - 2 \cdot (9 + 12) = 208 \text{ mm}$$

$$\text{Alas} := 2 \cdot (20.8 + 12.5) \cdot 1 = 66.6 \text{ cm}^2$$

$$I_p := 2 \cdot \left[ \left( \frac{1}{12} \cdot 20.8^3 \right) + \left[ 1 \cdot 66.6 \cdot \left( \frac{12.5}{2} \right)^2 \right] \right] = 6702.944 \text{ cm}^4$$

**Akibat beban geser sentris**

$$P_u = 168.64 \text{ kg}$$

$$f_u := \frac{P_u}{\text{Alas}} = 2.532 \text{ kg/cm}^2$$

**Akibat beban momen lentur**

$$M_u = 9402.48 \text{ kgm}$$

$$S_x := \frac{I_p}{12.5} = 536.235 \text{ cm}^3$$

$$f_h := \frac{M_u \cdot 100}{S_x} = 1753.424 \frac{\text{kg}}{\text{cm}^2}$$

$$f_{\text{tot}} := \sqrt{f_u^2 + f_h^2} = 1753.425 \frac{\text{kg}}{\text{cm}^2}$$

**Kekuatan rencana las**

$$\Phi f_n := (0.75 \cdot 0.6 \cdot 70 \cdot 70.3) = 2214.45 \frac{\text{kg}}{\text{cm}^2}$$

$$f_{\text{total}} < \Phi f_n$$

$$\text{teperlu} \geq \frac{f_{\text{tot}}}{\Phi f_n} = 0.261 \text{ cm}$$

$$\text{aperlu} \geq \frac{0.261}{0.707} = 0.369 \text{ cm}$$

Syarat :

$$a_{\text{min}} := 4 \text{ mm} \quad (t = 10 \text{ mm})$$

$$a_{effmax} := 0.707 \cdot \frac{3700 \cdot 0.6}{70 \cdot 70.3} = 0.319 \text{ cm (las di badan)}$$

$$a_{effmax} := 1.41 \cdot \frac{3700 \cdot 0.9}{70 \cdot 70.3} = 0.954 \text{ cm (las di daun)}$$

maka dipakai  $a = 4 \text{ mm} > a_{perlu} = 0.369 \text{ mm}$

- **Kontrol Pelat Sambung**

Pelat penyambung BJ 37

Direncanakan baut BJ 37

$$f_u := 3700 \text{ kg/cm}^2$$

$$f_{ub} := 3700 \text{ kg/cm}^2$$

$$f_y := 2400 \text{ kg/cm}^2$$

$$d_b := 1.6 \text{ cm}$$

$$t_p := 1 \text{ cm}$$

$$A_b := \frac{\pi}{4} \cdot 1.6^2 = 2.011 \text{ cm}^2$$

**Luas bidang geser**

$$L := 25 \text{ cm}$$

$$A_{nv} := (L - 3 \cdot d_b) \cdot t_p = 20.2 \text{ cm}^2$$

**Kuat Rencana**

$$\Phi P_n := 0.75 \cdot (0.6 \cdot f_u \cdot A_{nv}) = 33633 \text{ kg} \quad \blacksquare > \blacksquare \quad P_u = 168.64 \text{ kg}$$